



2-D Hydrodynamic and Sediment Transport Study in Rio Grande

Products

The product of this research will be a technical report and a conference paper describing flow hydrodynamics, sediment transport, and magnitude and rates of bed deformation for a reach of the Middle Rio Grande, based on current conditions.

Benefits

This study will describe the hydraulic and sediment transport processes of the Albuquerque Diversion Dam Reach of the Rio Grande, just south of the Alameda Bridge. The modeling efforts have utilized available sediment sampling data from Sandia National Laboratory, channel geometry data from the U.S. Army Corps of Engineers, Albuquerque District, and the University of New Mexico (UNM), and discharge and gauge records from the U.S. Geological Survey (USGS). Both steady (700; 2,000; 6,000; and 10,000 cfs) and unsteady (10,000 cfs at peak) flow events have been simulated. The impact of the diversion dam has also been examined using the model. The two-dimensional (2-D) model was successful in simulating flood zone coverage, nonuniform sediment sorting, and changes in channel geomorphology. Such information will be helpful in monitoring and managing the diversion dam, the bosque, and relevant habitat issues.

Issue

The Middle Rio Grande (MRG) is located in central New Mexico and was historically characterized as an aggrading sand bed channel with extensive lateral bank movement. Channel and flow alterations have significantly impacted the hydrodynamics of the river, bed deformation, and migration rates of sand dunes. The study region for this project was the Albuquerque Diversion Dam Reach of the MRG, which spans from the Alameda Boulevard Bridge to the Paseo Del Norte Bridge, including the Calabacillas Arroyo. The City of Albuquerque will soon divert water from the Rio Grande to supplement the city's drinking water supply. The effects of diversion dam operations on sediment transport in the reach are unknown.

Description

A two-dimensional (2-D) hydrodynamic and sediment transport model was needed to evaluate the morphodynamics within the Middle Rio Grande (MRG). The objective of this work unit was to apply the CCHE2D (hydrodynamics and sediment transport) model at the diversion dam reach and compare the model results with other 2-D models being used by the Sandia National Laboratory. To date, steady and unsteady simulations have been completed and the final analyses are underway. A draft technical report has been written and a final report will be submitted in September 2007.



Rio Grande, Albuquerque, NM

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